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# Factors Influencing Project Success Criteria

Bassam A. Hussein
Norwegian University of Science And Technology, Trondheim. Norway

*Abstract*— **This paper uses a literature review to present the risk factors that are most common to project success criteria through a project's entire life cycle. Empirical investigation and statistical analysis examined correlations between these factors. On the basis of the statistical correlations found we conclude that there are four factors in the initiation phase that could lead to the occurrence of additional risks factors in the implementation and evaluation phases. These are 1) having an incomplete set of criteria due to lack of knowledge about project context, 2) diverse and competing expectations about gains and benefits, 3) basing the project on unrealistic targets, and 4) using ambiguous criteria to describe the expected benefits or gains from the product or the project result. These factors affect all aspects of management and evaluation. The presence of these factors is also statistically correlated to the presence of other factors such as lack of organizational commitment and weakened alignment to success criteria in the performing organization and subjective assessment of the project outcome during evaluation phase.**

***Keywords—project success; success criteria; project managaement***

## I. INTRODUCTION

Research into project success criteria in project management literature can be grouped into three major classes.

### *A. Clusters of success criteria*

A class of research that focuses on defining what constitutes project success includes categories concerning stakeholders, timeline, project size or type [1-4]. This research also extends to examining how the perception of success has changed over the years [5-9]. This section of research is indeed the most dominant in project management literature on the subject, and it seeks to define a clear rational for deciding whether the project was a success/failure, and to some extent, the degree of success/failure. It was de Wit [5] who first suggested a distinction between project success and project management success. Project success embodies the perceived value of a project when the result or product is in operation. Project management success, on the other hand, is considered the ability to comply with time, cost, and scope requirements. These triple constraints are called, in literature, the "golden triangle" and are concerned with the efficiency of the project organization [10]. Project management success is also described as a narrow view of success [11].

Similar distinctions were suggested by Baccarini [3], who also distinguished between project management success and product success. Product success measures the benefits of a project's final product. Lim and Mohamed [2] made the distinction between micro and macro success. The micro perspective refers to the success perceived by the contractor or performing organization and the developer, during the implementation phase. The macro perspective refers to the success appreciated by other stakeholders and users over the entire project life cycle.

### *B. The rational fordefining success criteria*

The second class of research is less dominant in project management literature and looks into the significance of the criteria as a tool for shaping and managing a project.

According to Christenson and Walker [12] defining success criteria upfront is helpful to establish agreement on how and when a project will be evaluated, which helps create a common vision about the outcome, which is in itself a significant driver of project management success. Jugdev and Müller [13] supported this view and recommended defining a project's success criteria at the start as good project management practice.

Creating a common reference point for how projects will be evaluated is an important factor in aligning the project team and establishing commitment to the project objectives. Korzaan [14] showed that commitment to project objectives has a positive influence on perceptions of project performance both directly and indirectly through individual propensities to report project status information.

Hussein [15] showed that failing to actively using project success criteria in managing projects can lead to numerous and frequent change of criteria which in turn result in poor project performance, frustrations, and even losses. Poor management leads to poor intermediate results. Poor intermediate results lead to changing project priorities and this causes a project to lose focus [17]. A project's success criteria are also important for project risk management. It is now widely accepted that even moderate levels of risk management planning are sufficient to increase the chances of project success

### *C. Risk factors associated with success criteria*

The third category of research into success criteria considers the potential threats and challenges influencing the initial definition of criteria, as well as the implementation and evaluation phases. These risk factors, if not accurately addressed at the start of the initiation

phase, will lead to further complications in the execution and evaluation phases of the project. The risks found in project literature include:

- *The narrowness of the criteria*

Narrow focus refers to selecting a limited set of criteria that measures the focus on project management success. A narrow focus may reflect weak alignment between projects and businesses. Several authors, however, stressed the importance of regarding projects as tools for value creation in an organization [21-23]. This missing alignment may lead to several challenges for the performing organization during the execution phase such as lack of commitment, or lack of top management support which are both important success factors for projects [24-26].

- *Ambiguity*

Ambiguity refers to the use of success criteria which may be differently interpreted [27]. Ambiguous criteria are also known as soft or subjective criteria [28]. Hussein [15] gave several examples of ambiguous criteria including user satisfaction, the quality of being intuitive in use, user friendliness, ease of use, and safety. This category of criteria is hard to measure and therefore control. Time taken to clarify and understand the criteria may subject them to new interpretation and therefore to change, and might lead to improper allocation of resources or to misunderstandings in the performing organization.

Several authors have already stressed the importance of measurability of project objectives, through the use of SMART rule for instance [29]. Ambiguity also influences the way measurements are conducted after handing over. The difficulties of how to measure ambiguous criteria were also taken up in [9]. According to the author, success and failure are not only subjectively perceived and constructed by people, but are also entwined in meaning and action. A symbolic and rhetoric evaluation of project success and failure was therefore suggested by [9] to encounter the effect of ambiguity.

- *Diversity*

The presence of competing and conflicting criteria due to the diversity of a stakeholder's interest, power and influence is another factor that complicates the selection of success criteria. Westerveld [11] acknowledged the complications of agreeing on project success criteria not only because of competing criteria, but also because judgment is generally made by several and diverse stakeholders over different periods of time. Diversity reflects the degree of variation among stakeholders or within the project scope [30]. The diversity of stakeholders may involve geographical locations, national cultures, working practices, awareness of objectives (goal misperception), and the variety of skills or disciplines that are used in a project. The challenge that faces projects is how to accommodate the diverse, and even contradictory, expectations of all the stakeholders.

- *Incompleteness*

An additional factor that complicates the definition of project success criteria is uncertainty, or a lack of full knowledge about the range of project stakeholders at start-up [32], or lack of knowledge about the full range of use of the product or system. This is part of the fundamental uncertainty that characterizes project management [33].

- *Changes*

There is another dimension of uncertainty that might take place during exaction or at a later stage of the project. Such as, the impact of changing political factors, changing owners, changing state regulations, changing strategy or focus. Other changes may include suddenly urgent needs that force a project to change priorities or to add new criteria, or regulations, or new contextual conditions to meet these urgent needs. These kinds of changes are inevitable and are a part of the uncertainty in projects which is often cited as a lack of "true" knowledge [34].

- *Unrealistic targets*

Something that leads to the imperfect definition of success criteria is the (blown optimistic) expectation regarding the target of, for example, time, cost, or expected benefits [35]. This may lead stakeholders to perceive a project that was in fact successful in achieving near-optimal results as a partial failure. How success is defined affects the final judgment of success and failure [36].

- *Poor alignment of the performing organization to success criteria*

A lack of alignment with project success criteria in the performing organization is another risk factor that might complicate project management. Thomas and Fernández [37] found that companies with high levels of confidence in their IT projects not only agreed on a definition of success and consistently measured success, they also used the intermediate results actively in managing projects. This included; 1) the management of the project according to the agreed definition of success, 2) a willingness to stop projects, 3) accountability for results, 4) and a connection to learning. They further found that companies without accountability for results tended to complete *ex-post* evaluations inconsistently or not at all. There also appeared to be a greater tendency for politically motivated misrepresentations.

Couillard [38] demonstrated through a field study the correlation between an understanding of project objectives and effective project risk management. Hussein [15] provided several examples of how poor alignment impacts outcome.

- *Lack of organizational commitment to project success criteria*

According to Thomas and Fernández [37] companies who used the criteria effectively were willing to re-direct project resources based on an *a priori* understanding of the relative importance of project success criteria and were willing to stop projects. This resulted in improved project management and better use of resources. This implies that defining proper success criteria or clusters is simply not enough in order to achieve excellence in project management [39]. Proper measures in terms of strategies, rules, resources, and metrics should also accompany these success clusters. For instance, achieving a long term and wider benefit requires the strong involvement of the sponsor or project owner as disclosed by Munns and Bjeirmi [40]. According to Belassi and Tukel (1996), when time is important for achieving project management success, then a project manager's skills, and communication between team members become critical.

Other reported factors include a lack of ranking among the criteria [41], and lack of a process or scheme for measuring the achievement of long term objectives after handing over [42].

## II. Research Objectives

The literature review has shown that there are several identified risk factors that contribute to poor management and complications during identification, management and evaluation of project success criteria. These factors are shown and classified in three project phases; initiation/planning, implementation and evaluation as shown in Table I. The review has also shown that project success criteria can be broadly grouped into two categories; 1) criteria that describe important constraints to which project organization must adhere during execution. This includes, for example, criteria of time, cost, safety, and scope/specifications. This is called project management success criteria. 2) criteria that identify the impact of the project results (the product) on the end-users/ business/the performing organization/communities. Examples of this category include criteria involved with operational requirements, user satisfaction, and ease of use, profitability, market share, learning, and competence development, as shown in Table II.

The goal of this paper is three fold; 1) to investigate the correlation between the type of success criteria selected and the occurrence of the risk factors presented in Table I. 2) to examine correlations between these the identified risk factors in each phase and risk factors in other phases. 3) through regression analysis we intend to most predominant risk factors in the initiation/planning phase that impact other factors in the implementation and evaluation phase. Answering these questions might help project practitioners gain a better understanding about the choices that are made during the planning and initiation phases and to help them to better address significant risk factors in a proper way from the start of the project.

TABLE I. Risk factors influencing project success criteria along life cycle phases

| ID number | Risk factor influencing the criteria | Phase |
|---|---|---|
| 1 | Use of unrealistic targets (conservative or optimistic) | Initiation/planning |
| 2 | Use of ambiguous/soft criteria | Initiation/planning |
| 3 | Narrow focus (covering only project management success) | Initiation/planning |
| 4 | Diversity (balancing conflicting or competing criteria) | Initiation/planning |
| 5 | Lack of ranking among the criteria | Initiation/planning |
| 6 | Incompleteness (missing or omitted criteria) | |
| 7 | Lack of organizational commitment (in the form of resources, support to achieve the objectives) | Implementation |
| 8 | Lack of alignment in the preforming organization | Implementation |
| 9 | Changing context | Implementation |
| 10 | Lack of scale of measurements | Evaluation |
| 11 | Subjectivity of measurement | Evaluation |
| 12 | Lack of long-term scheme for measurement after handing over | Evaluation |

TABLE II. Broad classification of project success criteria in litrature

| Type | Examples |
|---|---|
| 1- Project management success | Time, cost, scope |
| 2- Project/ product success | Impact on (users, clients, business, community) |

## III. Method

For this study, a web-based survey was devised and sent to around 800 respondents worldwide. The survey can be reviewed at [43]. The survey was anonymous, but respondents had the opportunity to leave their contact information if they were willing to discuss the results of the survey with the author. Seventy-nine respondents returned valid responses and six expressed willingness to take part in in-depth interviews. In this paper we mainly focus on the results obtained by the web survey. Descriptive and analytical statistics will be used to interpret the results. The reliability test for the questionnaires gave a coefficient of 0.833 suggesting high reliability. Respondents were asked to recall their last project, or a project that they have thorough knowledge about, and answer several questions. The presentation of the results and the analysis of these questions will be the subject of forthcoming papers. In this paper we present the results obtained from two questions.

Q1: Respondents were asked to select, from the options given, the categories of project success criteria that had been defined up front?

Q2: Respondents were asked to select, on a scale from 1 to 5, the degree to which they believed each of the risk factors shown in Table 1 had encountered in their project, where 1 means rarely and 5 means frequently.

The survey therefore collected information about the observed occurrence of the risks and not about the respondent's opinion of the risk itself.

## IV. FINDINGS

The results of the computed mean and median for each factor is shown in Table III.

TABLE III. MEAN AND MEDIAN OF EACH FACTOR.

| Issue or factor influencing success criteria | Median | Mean |
|---|---|---|
| **Use of unrealistic targets (conservative or optimistic)** | **3** | **3.21** |
| Use of ambiguous / soft criteria | 3 | 3.04 |
| Narrow focus (covering only project management success) | 3 | 3.04 |
| Diversity (balancing conflicting or competing criteria) | 3 | 3.09 |
| **Lack of ranking among the criteria** | **3** | **3.38** |
| **Incomplete (missing or omitted criteria)** | **3** | **3.19** |
| Lack of organizational commitment (in the form of resources, support to achieve the objectives) | 3 | 3.09 |
| Lack of alignment in the preforming organization | 3 | 3.13 |
| **Changing context / uncertainty** | **3** | **3.41** |
| Lack of scale of measurements | 3 | 3.11 |
| **Subjectivity of measurement** | **4** | **3.37** |
| **Lack of long-term scheme for measurement after handing over** | **4** | **3.34** |

According to the data shown in the table there are 6 factors that were encountered more frequently, as reported by the respondents.

These factors are; in the initiation phase, 1) the use of unrealistic targets (mean value: 3,21) and 2) lack of ranking among the identified criteria (mean value: 3.38), 3) frequent changes to success criteria (mean value 3.41), 4) incomplete (mean value 3.19), 5) subjectivity of measurements (mean value: 3.37), and 6) lack of method to measure long-term success (mean value: 3.34). The table also shows that the median of both last factors is 4.

The study also collected data from respondents about the type of criteria used in their projects and the results are shown in Table IV.

A median test using the grouping variable (Type of success criteria) was also performed. The objective of the test was to determine whether the distribution of each factor across the grouping variable (Type of the criteria) is the same. The frequency table for the median test is shown in Table V. The table shows that the distribution of (unrealistic target) is the same across the grouping variable. This means that the type of criteria selected has no impact on the occurrence of this factor. On the other hand, distribution of (narrow focus) is not the same across the grouping variable. The number of cases that are higher than the median for Type 1 criteria are higher than the number of cases for Type 2. This indicates that the occurrence of (narrow focus) is evidently more frequent when Type 1 criteria are selected. Two factors (lack of ranking) and (incomplete) are frequent when Type 1 criteria are selected. On the other hand, (contextual changes), (lack of alignment in the performing organization), and (lack of organizational commitment) are more frequent when Type 2 criteria are selected. Other factors remain unaffected by the grouping variable.

TABLE IV. FREQUENCY TABLE OF TYPE OF CRITERIA

| Type | Frequency | Percent |
|---|---|---|
| Type 1) Only Project management success criteria | 23 | 29.1 |
| Type 2) Only Project success related criteria | 30 | 38.0 |
| Both Type 1 and Type 2 | 26 | 32.9 |

TABLE V. FREQUENCY TABLE FOR THE MEDIAN TEST.

| Factor | | Type 1 | Type 2 |
|---|---|---|---|
| None realistic target | > Median | 8 | 12 |
| | <= Median | 15 | 18 |
| Ambiguous | > Median | 8 | **15** |
| | <= Median | 15 | **15** |
| Narrow focus | > Median | **15** | 7 |
| | <= Median | **8** | 23 |
| Diversity | > Median | 8 | **15** |
| | <= Median | 15 | **15** |
| Lack of ranking | > Median | **12** | 11 |
| | <= Median | **11** | 19 |
| Incomplete | > Median | **12** | 12 |
| | <= Median | **11** | 18 |
| Lack of organizational commitment | > Median | 6 | 12 |
| | <= Median | 17 | 18 |
| Lack of alignment in the PO | > Median | 6 | 14 |
| | <= Median | 17 | 16 |
| Changes | > Median | 11 | **15** |
| | <= Median | 12 | **15** |

The data was examined for statistical correlations between the factors. A linear regression test was also conducted to single out the most important predictors of each factor. The significant correlations and the linear regression test are summarized in Table VI. Only significant correlations at the 0.01 level (2-tailed) are shown.

The results obtained show, for instance, that in the initiation/planning phase the presence of (use of ambiguous criteria) is significantly correlated with the presence of three factors; 1) diversity, 2) lack of knowledge about stakeholders resulting in an incomplete

set of criteria, 3) and the presence of unrealistic targets (overblown or pessimistic).

TABLE VI. SIGNFICANT CORRELATIONS AND LINEAR REGRESSION TEST

| Factor | Significant correlation at the 0.01 level (2 tailed) | Liner regression test Most important predictor (importance ) |
|---|---|---|
| Ambiguous | Diversity .382** | Diversity (.44)<br>Incomplete (.39)<br>Unrealistic target (0.17) |
| Narrow focus | Incomplete 0.298** | Incomplete (1) |
| Lack of ranking | Incomplete 0.**376**** | Incomplete (1) |
| Lack of organizational commitment | Use of ambiguous criteria.**402****<br>Diversity .**400****<br>Incomplete 0.**567**** | Incomplete (0.61)<br>Diversity (0.19)<br>Ambiguous criteria(0.18) |
| Alignment in the performing organization | Use of unrealistic targets.346**<br>Use of ambiguous criteria.340**<br>Diversity439**,<br>Lack of ranking among the criteria.289**<br>Incomplete.353** | Use of unrealistic targets (0.38)<br>Diversity (0.35)<br>Ambiguous criteria(0.12) |
| Changes | Narrow focus.300**<br>Diversity .437**<br>Lack of organizational commitment.302**<br>Alignment in the performing organization.390** | Diversity (0.44)<br>Narrow focus (0.35)<br>Alignment in the performing organization (0.2) |
| Subjective assessment | Use of ambiguous criteria.466**<br>Lack of organizational commitment.366**<br>Attitude in the preforming organization.360**<br>Incomplete 0.**404**** | Use of ambiguous criteria (0.57)<br>Incomplete (0.3) |

The results also show that the having success criteria that focuses only on the operational phase can be linked to uncertainty about the full range of stakeholders or operational requirements (incomplete). Lack of ranking could also be attributed to the lack of full knowledge about the stakeholders and their precise expectations.

In the execution phase, the effect of the risk factors resulting from the initiation/phase is very evident. For instance, Table VI shows that the occurrence of (lack of organizational commitment) is correlated with three risk factors (incomplete set of criteria, diversity, and ambiguity). Results may therefore suggest that reducing the occurrence of these factors or reducing their impact should also help to increase top management support and gain better commitment from top management.

Similarly, we may conclude that (alignment in the performing organization) could also be enhanced by avoiding or reducing the likelihood of occurrence of the (use of unrealistic targets), having better methods of addressing (diversity) in order to balance expectations of the project. A combination of unrealistic targets, competing expectations, and ambiguous formulation of criteria does not contribute to better alignment of the criteria in the performing organization.

Occurrence of changes during execution phase is shown to be correlated to (diversity), (narrow focus) and (lack of alignment in the performing organization). This might imply that failing to balance diverse and competing expectations from the start will lead to changes during execution, and this may lead to further disruption and loss of focus. The degree of changes that takes place during the course of the project seems to be correlated with (narrow focus). The higher the alignment of the project success criteria with business goals (less narrow) the less likely that there will be changes to the project.

In the evaluation phase, the use of subjective evaluation could be attributed to two factors from the initiation phase: ambiguity and lack of full knowledge about stakeholders. This is no conclusion but an observation in fact, the higher the use of ambiguous and incomplete criteria the more likely that measurement will also be based on subjective assessment. An inability or failure to measure long-term criteria seems to be linked to the subjectivity of measurements, that is, basing the entire assessment on using rhetoric and subjective interpretation of the outcome also contributes to failure to measure the long-term criteria.

## V. CONCLUSIONS

The goal of this paper was to conduct an empirical investigation to examine the correlation between several risk factors that complicate the definition and management of project success criteria. On the basis of a comprehensive literature review twelve different factors were identified. A survey was then conducted in order to collect empirical data about the frequency of occurrence of these factors in real life projects. On the basis of the statistical correlation we may conclude that there are four factors in the initiation phase that, if occurring, will lead to the occurrence of risk factors in the implementation and evaluation phase. These are 1) having an incomplete set of criteria, 2) diversity, 3) basing a project on unrealistic targets, and 4) using ambiguous/no measurable criteria. These factors affect all aspects of management and evaluation.

From Table V we can see that the presence of the first risk factor (incomplete set of criteria) is more evident when Type 1 criteria are selected. This may suggest that there is perhaps a need to better understand project stakeholders who have influence on the project context in order to ensure that success criteria includes all the requirements. Diversity, on the other hand, is more present when selecting Type 2 criteria. This suggests that efforts should be made to balance stakeholder expectations of gains or benefits from a project when the product or service is in operation. The same applies to the presence of ambiguous criteria, which is more evident when selecting Type 2 criteria. Measurability of the

benefits or gains expected by the project should be addressed more carefully.

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